

forming a polysilicon structure on [a layer] **an emitter region position** of the transistor, the polysilicon structure including a doped diffusion barrier layer on the [layer] **emitter region position** and a polysilicon layer on the diffusion barrier layer; depositing metal including at least one of aluminum, gold, and silver on the polysilicon layer; and heating at least the deposited metal and the polysilicon structure to urge diffusion of the deposited metal into the polysilicon layer, **with the doped diffusion barrier layer inhibiting diffusion of the deposited metal into the emitter region position of the transistor.**

20. (Amended) A method of making a metal contact for a bipolar transistor, the method comprising:

**forming a conductive diffusion barrier over an emitter region position of the transistor;**

forming a polysilicon structure [on a layer of the transistor] **on the conductive diffusion barrier;** and

substituting metal for at least a portion of the polysilicon structure **to form a metal contact having a lower-most surface overlying the emitter region position of the transistor.**

23. (Amended) A method of making a bipolar transistor having self-aligned base contacts and self-aligned metal emitter contact, the method comprising:

forming first and second polysilicon base contacts on a semiconductive layer, the contacts spaced apart to define an active region in the semiconductive layer;

outdiffusing dopant from the first and second base contacts into the semiconductive layer to form extrinsic base regions aligned with the base contacts;

implanting an intrinsic base region in the active region;

forming a doped diffusion barrier layer on the intrinsic base region;

forming a doped polysilicon [structure on the intrinsic base region] **layer on the doped diffusion barrier layer;**

AMENDMENT AND RESPONSE

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forming an emitter region self-aligned with the doped [polysilicon structure] **diffusion barrier layer** by outdiffusing dopant from the doped [polysilicon structure] **diffusion barrier layer** into the intrinsic base region; and substituting metal for at least a portion of the polysilicon [structure] **layer** after forming the emitter region, thereby forming a metal emitter contact self-aligned with the emitter region.

24. (Amended) The method of claim 23:

[wherein the polysilicon structure includes:

a doped diffusion barrier layer on the intrinsic base region; and  
a polysilicon layer on the doped diffusion barrier layer; and]

wherein substituting metal for at least a portion of the polysilicon structure includes substituting metal for substantially all of the polysilicon layer.

28. (Amended) A method of reducing emitter resistance of a bipolar transistor, the method comprising:

forming a bipolar transistor structure having a polysilicon emitter contact **electrically coupled to an emitter region of the transistor structure**;  
substituting metal for at least a portion of the polysilicon emitter contact **without shorting the emitter region of the transistor**.

Please add new claims 32-39 as follows:

32. (New) A method of making a bipolar transistor having self-aligned base contacts and self-aligned metal emitter contact, the method comprising:

forming first and second polysilicon base contacts on a semiconductive layer, the contacts spaced apart to define an active region in the semiconductive layer;  
outdiffusing dopant from the first and second base contacts into the semiconductive layer to form extrinsic base regions aligned with the base contacts;  
implanting an intrinsic base region in the active region;  
forming a doped polysilicon structure on the intrinsic base region, wherein the polysilicon

structure includes:

a doped diffusion barrier layer on the intrinsic base region; and

a polysilicon layer on the doped diffusion barrier layer; and

forming an emitter region self-aligned with the doped polysilicon structure by

outdiffusing dopant from the doped polysilicon structure into the intrinsic base region; and

substituting metal for substantially all of the polysilicon layer after forming the emitter region, thereby forming a metal emitter contact self-aligned with the emitter region.

33. (New) A method of making a metal emitter contact for an emitter region position of a bipolar transistor, the method comprising:

forming a diffusion barrier layer over the emitter region position of a semiconductive substrate;

forming a polysilicon layer on the diffusion barrier layer and over the emitter region position; and

substituting metal for at least a portion of the polysilicon layer to produce the metal emitter contact, the metal emitter contact electrically coupled to the emitter region through the diffusion barrier layer.

34. (New) The method of claim 33 wherein the diffusion barrier layer includes a dopant, and the method further comprises outdiffusing at least a portion of the dopant into the emitter region position.

35. (New) A method of making an emitter contact for an emitter region position of a bipolar transistor, the method comprising:

forming a polysilicon structure over an emitter region position of a semiconductive substrate, the substrate having a surface at the emitter region position; and

substituting metal for at least a portion of the polysilicon structure to produce a metal emitter contact have a surface confronting the surface of the substrate.